

# 83 A Suitable Habitat



Introduced species do not always survive in new environments. This is because all species have requirements for the place in which they can live. These requirements define the species' **habitat** (HAB-ih-tat). What makes up a habitat? Think about different aquatic ecosystems, such as a small pond or a coral reef. While both of these environments contain water, they have very different characteristics. Coral reefs are found in the ocean, which contains salt water, while most ponds are freshwater. An organism that lives in freshwater, like a zebra mussel, cannot survive in the coral reef environment. The photos below show several different habitats.

Producers, consumers, and decomposers are the living components of an ecosystem. Every ecosystem also has many non-living elements, such as rainfall, light, and temperature. The interaction of all these determines whether a habitat is suitable for a specific organism.



## CHALLENGE

What are some of the important non-living characteristics of a habitat?

## MATERIALS



For each group of four students

- 5 blackworms (*Lumbriculus variegatus*)
- 1 150-mm petri dish
- 1 pipet
- 1 cup of treated tap water (or spring water)
- 1 dropper
- sand
- aquarium gravel
- aquatic leaf litter (such as oak leaves in spring water)

For each student

- 1 Student Sheet 83.1, "Three-Level Reading Guide: Populations, Communities, Biomes, and Ecosystems"

## PROCEDURE

## Part A

1. Fill the base of a petri dish with treated tap water (or spring water) and place 5 blackworms in it.
2. Observe how the blackworms respond over the next few minutes. Discuss with your group any behaviors that seem to be true of all or most of the blackworms.



3. As a class, discuss what type of data you could collect on the blackworms in order to determine which type(s) of material provides a good habitat for them.
4. Compare the different materials you can use to create a blackworm habitat. Record any similarities and differences in the physical characteristics of the different habitat materials.

*Numerous habitats make up a pond ecosystem.*

5. With your group, design an experiment to investigate which type(s) of material provides a good blackworm habitat.

When designing your experiment, think about the following questions:

- What is the purpose of your experiment?
  - What variable are you testing?
  - What variables will you keep the same?
  - What is your hypothesis?
  - How many trials will you conduct?
  - Will you collect qualitative and/or quantitative data? How will these data help you to make a conclusion?
  - How will you record these data?
6. Record your hypothesis and your planned experimental procedure in your science notebook.
  7. Make a data table that has space for all the data you need to record. You will fill it in during your experiment.
  8. Obtain your teacher's approval of your experiment.
  9. Conduct your experiment and record your results.

## Part B

Use Student Sheet 83.1, "Three-Level Reading Guide: Populations, Communities, Biomes, and Ecosystems," to guide you as you complete the following reading.

## READING

You have been investigating the habitat of the blackworm. Using sand, gravel, and leaf litter, you created a habitat. Then, you observed blackworms interacting with that habitat. A group of blackworms living in the same habitat is known as a **population**. In one habitat there may be numerous populations of various species. For example, in a freshwater pond, there might be populations of blackworms, snails, water plants, and fish. Populations of diverse organisms that live in one area are known as a community.

The food webs that you looked at in Activity 79, "Eating for Energy," and in Activity 80, "Nature's Recyclers," were examples of communities. Scientists think that communities with many populations are more stable than those with only a few populations. If a change occurs in a community with many populations, the chance that some of those populations will survive is good.

*This pond is filling with sediment and will eventually disappear. What will happen to the aquatic organisms that depend on the pond?*



The interaction between communities of living things and the nonliving environment is known as an **ecosystem**. An ecosystem can be as small as a puddle or as large as the earth. Ecosystems are constantly changing. Take, for example, the effects on the ecosystem if a pond fills with sediment from erosion. Aquatic animals and water plants would die. Even birds and insects that depend on the pond for food would disappear. Eventually, a new ecosystem would develop based on the grasses that would sprout from the new sediments.

Organisms have adaptive characteristics that allow them to survive in a particular ecosystem. For instance, in the desert water is scarce. Cacti and other desert plants have thick, waxy surfaces that hold water inside the plant. Animals have adaptive characteristics and behaviors as well. To avoid the heat, many desert animals only hunt at night.

Environments have varying temperatures, amounts of moisture, and amounts of light. These contribute to the climate of an area. In a particular area, the interaction of climate, geography, and plant and animal life is called a **biome** (BY-oam). While biomes that are similar to each other exist throughout the world, the ecosystems that exist in each biome are not the same. Think about the rain forest biomes of the Amazon in South America and those of Australia. Although the physical characteristics are similar, the plant and animal life and the ecosystems they are part of make the biomes very different.

On the next page are the major types of biomes of the world. Think about the unique features of each one.



### **FRESHWATER**

- Includes lakes, rivers, and wetlands
- Many types of animals
- Primary source of water for drinking and irrigation



### **MARINE (SALTWATER)**

- Includes oceans, coral reefs, and estuaries
- Supports many forms of life
- Plays a role in regulating the earth's temperature



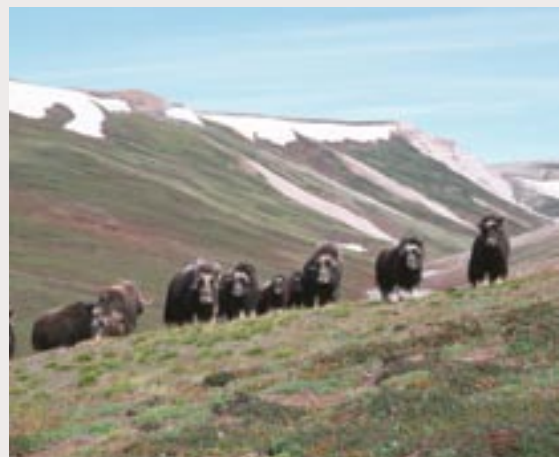
### **DESERT**

- Dry, may be hot or cold
- Sandy soil
- Few plants and animals, mostly reptiles and small mammals



### **TUNDRA**

- Dry and cold
- Permafrost (frozen soil)
- Few plants and animals, mostly migrating mammals



### CONIFEROUS FOREST (TAIGA)

- Adequate water, cool year-round
- Poor and rocky soil
- Many mammals, birds, insects, and conifers (cone-bearing plants)



### DECIDUOUS FOREST

- Adequate water, cool and warm season
- Fertile soil
- Many animals and deciduous plants (plants that lose their leaves yearly)



### GRASSLAND

- Both dry and wet season, warm to hot
- Fertile soil
- Many animals and grasses, with very few or no trees



### TROPICAL RAIN FOREST

- Very wet and very warm
- Acidic soil with few nutrients
- Many animals and plants, with great diversity




All of these biomes make up the earth’s ecosystem. Human activities pose threats to each of these biomes. Some of these threats are shown in the table below.

Examples of Threats to Biomes	
Biome	Ecological Threat
Freshwater	Farmland runoff and industrial pollution
Marine	Overfishing and pollution
Desert	Recreation and development
Tundra	Hunting and pollution
Taiga (coniferous forest)	Logging, commercial and private development
Deciduous forest	Logging, commercial and private development
Grassland	Development
Tropical rain forest	Logging, slash-and-burn farm development


Another potential threat to earth’s biomes is global climate change. Consider the marine biome. Microscopic phytoplankton produce more than half of the oxygen in the atmosphere. Scientists have collected data that suggest that warmer oceans might reduce phytoplankton populations. This in turn could reduce the amount of oxygen and food available for other organisms.

ANALYSIS


Part A

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1.

Based on your experiment, which type(s) of material provides a good habitat for blackworms? Explain how your experimental results support your conclusions.
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2.

Describe the non-living characteristics of a habitat.  
**Hint:** What non-living factors could affect whether organisms will survive and reproduce?
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3.


What could you do with your blackworms to investigate if a warm or cold habitat is better for them? Write a procedure that anyone in your class could follow to investigate this question.

### Part B

4. What are two common biomes in the United States? Where are they located?
-  5. Draw a diagram that shows the relationship among ecosystems, habitats, biomes, populations, and communities.
6. Choose one of the biomes, and explain how serious damage to this biome would affect ecosystems on earth.
7. **Reflection:** Do you think that introduced species are always successful in new environments? Explain.



### EXTENSION

-  Go to the *Issues and Life Science* page of the SEPUP website to find out more about relationships within an ecosystem and ecological threats to the world's biomes.